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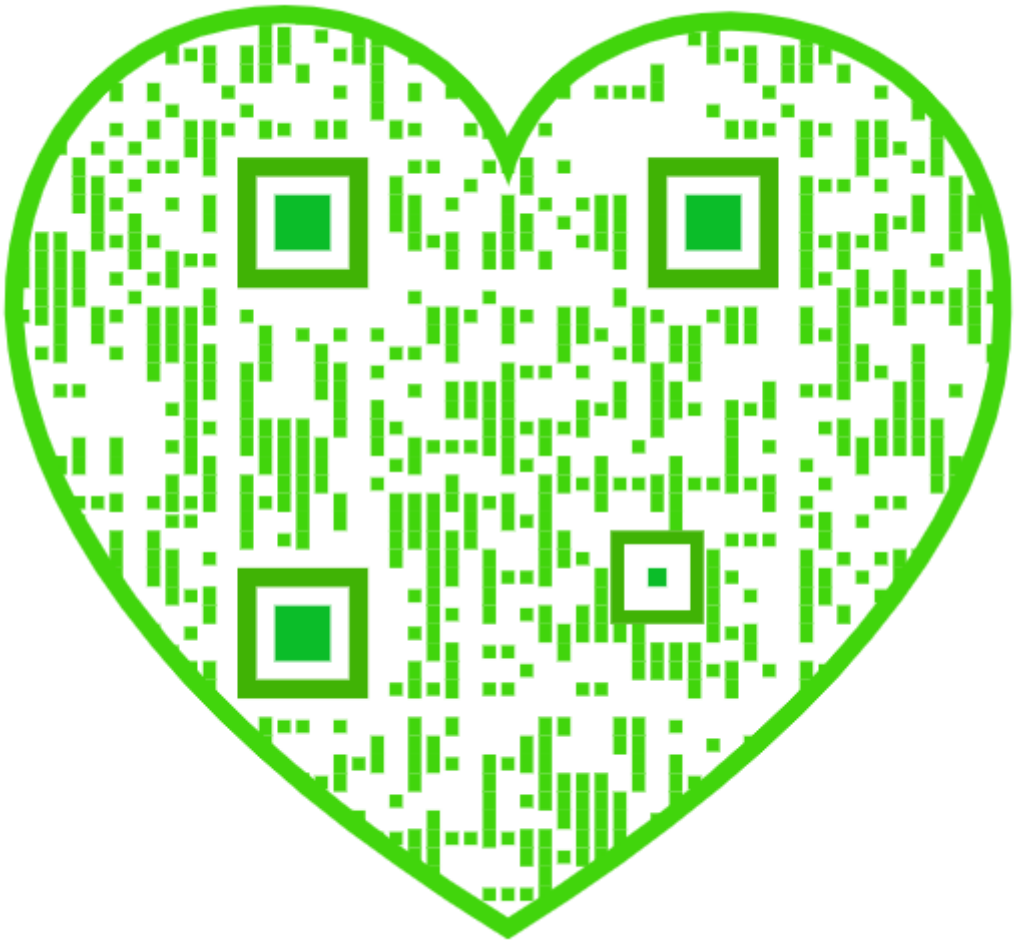
# THE HERCULES ICE MAKING AND REFRIGERATING MACHINES.

HERCULES IRON WORKS,
CHICAGO, ILL.



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# ILLUSTRATED CIRCULAR

OF THE

# HERCULES ICE MAKING

AND

# REFRIGERATING MACHINERY,

MANUFACTURED UNDER THEIR OWN PATENTS BY THE

## HERCULES IRON WORKS,

CHICAGO, ILLS.

1891

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The Craig Press
Printers
77 & 79 Jackson Street
Chicago

THE ANGLO-AMERICAN PROVISION CO.,

UNION STOCK YARDS, CHICAGO, ILL.

AFTER USING 70 TONS MACHINE TWO YEARS, SAYS:

*"Little trace of wear."*

*"Every way satisfactory."*

*"Not only meets your guarantee, but exceeds it."*

*"Five machines of other manufacture in use, but yours is the most economical."*

---

AND, AFTER USING ABOVE MACHINE FIVE YEARS, ADDS:

*"Our opinion, as above expressed, remains unchanged. * * Have since purchased three more 'Hercules' of 80 tons each for our Omaha, Nebraska, House."*

The above extract, and all those which follow, are taken from complete letters on file in our office.

THE JACOB DOLD PACKING CO.,

KANSAS CITY, MISSOURI.

AFTER TESTING 65 TONS MACHINE, SAYS:—

*"Gratified with results of test."*

*"Tests show eleven and one-third tons more daily duty than stipulated in contract."*

*"Our choice could not have fallen upon a better machine."*

---

AND ONE YEAR LATER THEY SAY:—

*"Entirely satisfied."*

*"Performs all you guarantee."*

# INTRODUCTORY.

MORE than five years have elapsed since the Hercules Ice and Refrigerating Machines were first placed upon the market. The constantly increasing demand, and the uniformly high record made by these machines fully justify our claims of their superiority.

We entered upon this business under unusually favorable conditions. As designers and builders of heavy machinery of various descriptions, comprising Corliss and marine engines, hydraulic machinery, complete equipments for rolling mills, etc., we had placed the Hercules Iron Works in the foremost rank; and, with a large force of skilled workmen, and shops amply stocked with appliances of the latest design, we were fully assured of results far in advance of the most successful, and superior to any of our competitors, all of whom were compelled to resort to general machine shops for the manufacture of their plants, instead of availing themselves of the unusual advantages we possess in our specialty works.

Starting out with what we believed to be a machine mechanically and scientifically correct in design, we determined to maintain the grade of workmanship at the highest point, and that nothing but the best material should enter into the construction of machinery upon which such large interests depended.

As the demands for the Hercules increased, and our business became extended over an ever-enlarging

territory, we have gradually dropped other lines of work, have added special tools for the rapid construction and exact duplication of the various sizes of ice-making and refrigerating machines, and have thrown our whole energy into what was formerly only a single department of our business. With works thus completely equipped, and with workmen, both in our shops and as erecting engineers, who have become thoroughly competent by years of experience, we have no hesitation in asserting that the "Hercules" is the most intelligently designed, the best constructed, and the most carefully erected machine on the market. Every portion of the machine is constructed at our works under the supervision of skilled superintendents, and all material used is thoroughly inspected and rigidly tested.

An exceedingly strong and durable machine, of the simplest possible construction, with all the parts so arranged as to give the greatest results with the expenditure of the least amount of fuel, has been the central idea which we have always kept in view. The "Hercules" has no intricate or delicate parts requiring the constant care of an expert, but it can be operated by any one competent to take charge of a steam engine.

The only conclusive test of any machine is that given by years of service, and the most convincing statements regarding its merits come, not from the maker but from the user. Such results of the tests of time, and such words of commendation from our patrons will be found in other portions of this circular.

The mechanical industries have reached a high stage of development. No branch of mechanical science is more important, or has demanded a higher degree of skill than artificial refrigeration, and the manufacture of pure ice. The "Hercules" is the embodiment of the most advanced knowledge upon the subject.

LIBBY, McNEILL & LIBBY, PACKERS,

UNION STOCK YARDS, CHICAGO.

80 TONS MACHINE, IN USE ONE YEAR.

*"Gives complete satisfaction in all respects."*

*"Thoroughly satisfied with our choice."*

*"Your guarantees were broad, but you have far exceeded them."*

---

Have received an order from this firm for another machine, of same size, to be erected Feb. 1, 1890.

THE LONE STAR BREWING COMPANY,

SAN ANTONIO, TEXAS,

75 TONS MACHINE, SECOND YEAR.

*"Best refrigerating machine in existence to-day, not only for economy in fuel, but for general efficiency."*

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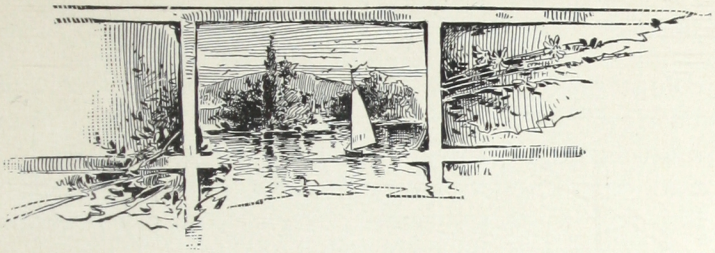
SAME MACHINE. THIRD YEAR.

*"Not cost one cent for repairs."*
*"Performs more work than guaranteed by you."*
*"Perfectly satisfactory."*



# OUR SYSTEM.

THE principles governing artificial refrigeration are simple, and have so often been described, and are so well known, that we will refer to them but briefly. By common consent manufacturers have, almost without exception, adopted ammonia as the most satisfactory refrigerating agent, and to a very large extent they are agreed that compressing the ammonia by means of pumps driven by a steam engine is the most desirable and economical method of producing the desired result.

Every refrigerating apparatus consists of three parts: viz.

[1] An Engine and Ammonia Pumps which compress the gas to a liquifying pressure.

[2] A Condenser in which the gas is cooled and changed to a liquid.

[3] A system of Evaporating Coils, in which the liquid ammonia is expanded into a gaseous state, and then cools the surrounding space by the absorption of heat.

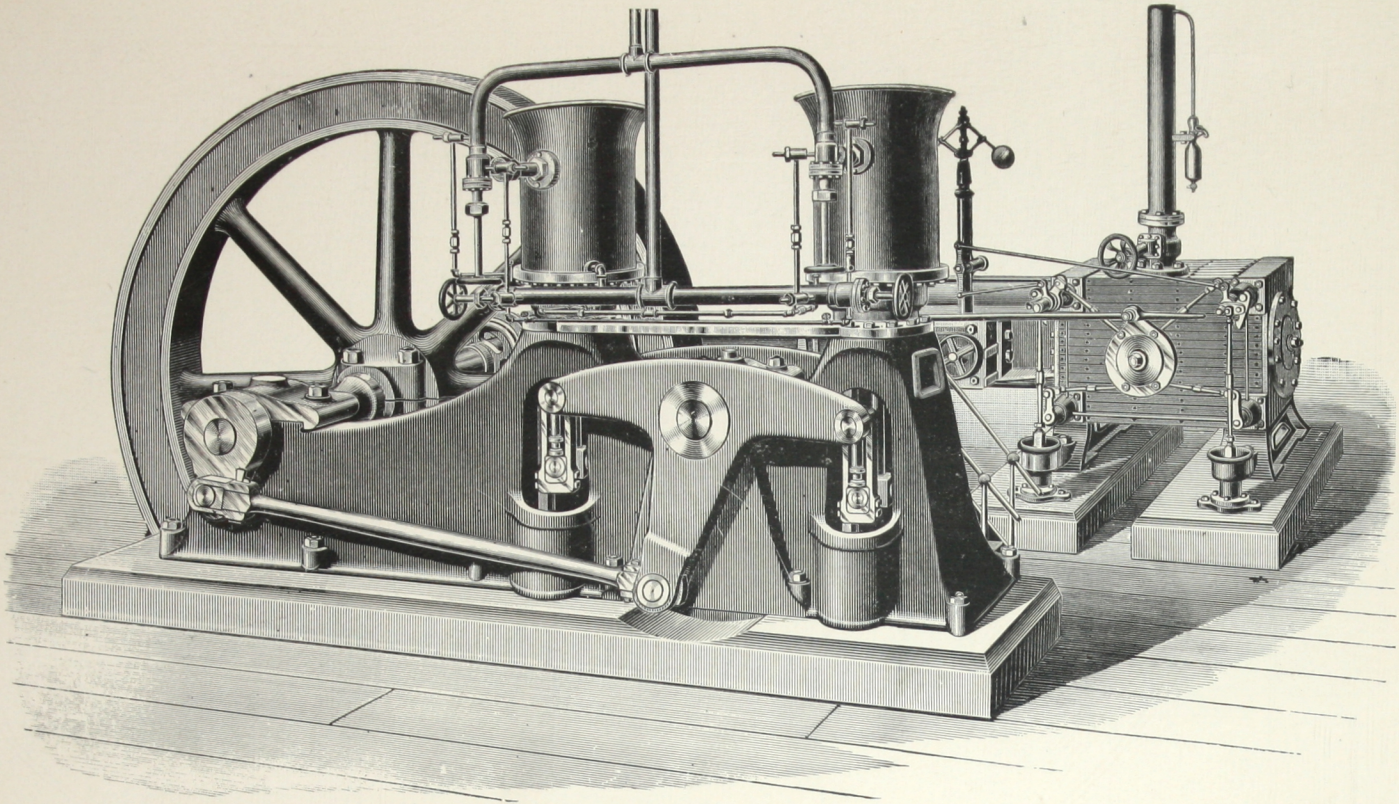
For the benefit of those unacquainted with the method of operating cooling machinery, we will explain that the ammonia is furnished in heavy iron drums, and is allowed to enter the evaporating coils, and from thence to the induction pipe of the compression pumps it is drawn into the cylinders where it is

compressed into a comparatively small volume. Passing from the pumps it enters a system of pipes known as the Condenser, which is either placed in a tank containing water or is sprinkled by water flowing over it, the former being called a submerged condenser, and the latter an open air condenser. The ammonia is thus cooled to the temperature of the condensing water, and, becoming liquified, is then ready for use.

In the Brine system we use one or more tanks of salt water, in which the evaporating coils are submerged, and the liquid ammonia, allowed to expand within the coils, assumes its original gaseous condition, and in doing so absorbs the heat from the surrounding brine, reducing it to any required temperature. In ice-making the brine tank is adapted to receive cans containing fresh water, which remain until their contents are frozen. For refrigeration the brine is pumped through a system of coils which are placed in the rooms to be cooled, and the brine absorbing the heat, returns to the tank to be again cooled, and so on through an endless round of cooling and warming.

In the Direct Expansion system the ammonia expands directly in coils placed in the rooms to be cooled, the pipes being stronger, but in other respects similar to those used in the brine circulation.

A detailed description of the various parts composing the "Hercules" machine will now be given.



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# THE ENGINE.

With an experience of over twenty years as designers and builders of high grade steam engines, the selection of the type of motive power received our careful attention. The well established advantages of the "Corliss engine" decided us in favor of its adoption, and the results obtained have been in the highest degree satisfactory.

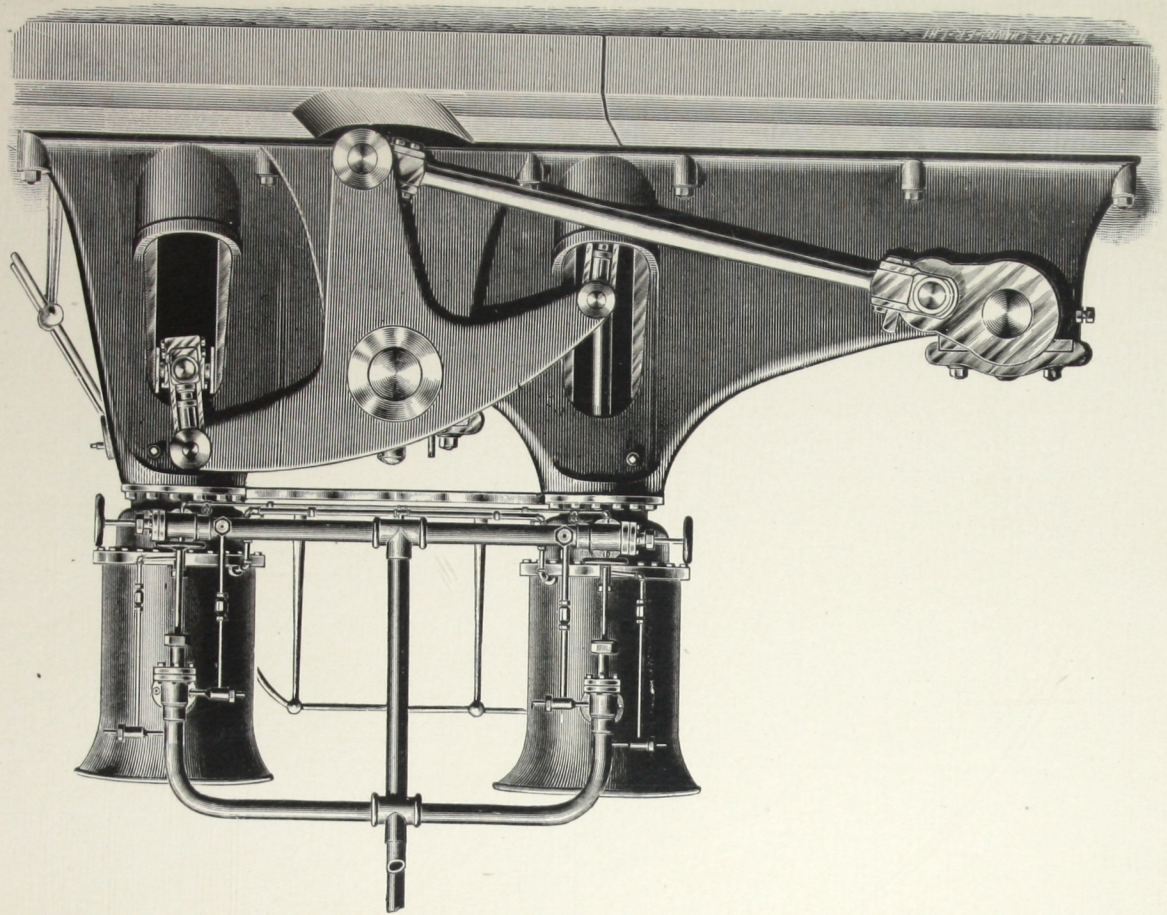
THE ENGINE is complete in itself, its power being transmitted to the compressor from a crank placed on the extremity of its main shaft. The distance between the engine and compressor is determined by the main shaft, which may be of any required length. Pulleys may be placed on the shaft to drive machinery outside of the refrigerating plant. All portions of the engine are built to standard gauges and templates, and duplicate parts are at all times carried in stock. Nothing but the highest grade of material is used and strictly first-class workmanship employed in its construction.

Special attention is directed to our fly-wheel, which is of great weight and perfectly balanced. Our governor is of a very sensitive pattern, and the fly wheel is of sufficient diameter and weight to insure and maintain perfect regularity. The absence of all vibration, and the smooth and steady stroke of the "Hercules," from the smallest size to those of one hundred tons and upwards, give ample evidence that the most difficult of all acquirements of the designer of machinery—the proper proportion of each part—has been carefully studied and successfully applied.

# THE COMPRESSOR.

The one great distinguishing feature of rival machinery consists in the COMPRESSION PUMPS. To them more than any other portion has the attention of inventors been directed. Nearly all builders, ourselves included, are agreed that compression pumps should be in a vertical position. Until the introduction of the "Hercules" the usual plan was to raise the pump cylinders high in the air, (sometimes in the case of large machines, thirty feet or more,) and connect downwards with the piston rods, cross heads and connecting rods to internal cranks near the floor. The waste of room, the long flights of stairs for the engineer to climb frequently, the impossibility of reaching the top quickly in case of emergency, the great unsteadiness and the undue strain upon foundations, the use of internal cranks which are liable to break and impossible to repair, besides many other objections, caused us to inquire if some other design might not be found which would be free from such difficulties and more in accordance with the mechanical advancement of the day.

By reference to the illustration of the "Hercules" Compressor, the solution of the problem is shown. Still preserving the vertical position of the cylinders, by one of the simplest and most approved mechanical devices the rotary motion imparted by the engine is changed into the required reciprocating motion for driving the pumps, all parts being compact and rigid, with loss of friction far less than by the old methods.



The MAIN FRAME of the Compressor, made in a single casting of great weight, is spread over a foundation surface nearly the length of the engine itself and of ample breadth. Heavy steel beams, securely keyed to a steel rock shaft are placed on each side, and from their ends hang four links which connect with the steel cross heads of the pumps, moving them up and down in guides bored from the solid metal of the frame. No simpler nor easier motion has ever been devised, and by its use we have the combination of vertical pumps with a main frame, horizontal, massive, and stable, all portions being as accessible as the engine itself.

An iron platform and stairs are provided for examining the upper portion of the pumps. All valves used in handling the machine are within easy reach of the engineer while standing on the engine-room floor. On our 100 tons machine the height of the platform from the top of the foundations is only five and one half feet, and the tops of the cylinders only eight and one half feet. On smaller machines the height is proportionately less.

The "Hercules" compressor has been critically examined by many competent mechanical engineers, every one of whom has pronounced it a model of mechanical excellence.

# THE COMPRESSION PUMPS.

The parts of the machine already described—the engine, carefully designed to produce the maximum of power with the minimum expenditure of fuel; the heavy fly-wheel, insuring regularity of motion; the rigid compressor frame, with its working parts of steel; all representing the most advanced mechanical thought of the day, are used for the single purpose of operating the two ammonia pumps placed on top of the compressor frame. What the heart is to the human body, these pumps are to the machine. The degree of perfection in their design and construction, represents, therefore, the degree of their efficiency.

In designing the "Hercules" we began with the pump, as we were assured that when that was perfected, all other problems would be less difficult of solution. The requirements of a good pump are: to instantly admit the gas to the cylinder, to fill it full at each stroke, and, after compressing, to expel the entire contents of the pump through the outlet valve. Valves of ample area, durable in construction and reliable in action, must be supplied. A piston is required that is absolutely tight, yet working freely, and a stuffing box for the piston rod in which the packing can be readily tightened while in operation.

The desideratum in constructing a refrigerating machine pump is to admit the ammonia into the cylinder so that the pressure in the cylinder shall be the same as that in the evaporating coils. The "Hercules" is the only machine manufactured that perfectly accomplishes this, by freely admitting the gas into the cylinder from the annular openings, which are situated at the extreme lower end of the cylinder, and which is filled with gas at the evaporating pressure.

## ARTESIAN ICE COMPANY,

FORT WORTH, TEXAS.

20 TONS ICE MAKING.

*"Eminently satisfied."*
*"Has performed every guarantee."*
*"Coal and water less than contract provides."*
*"Machine performs more than your guarantee."*

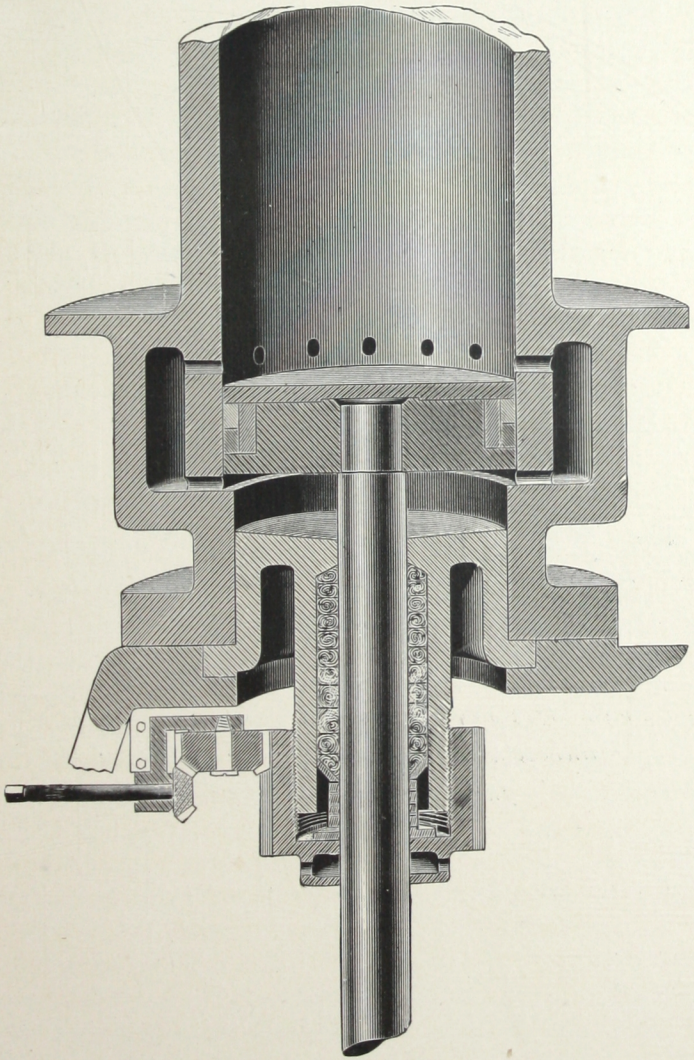
AT CLOSE OF FIRST YEAR.

*"Getting along finely."*
*"Every thing working smoothly."*
*"Have sold all the ice we could make."*
*"Customers say it is the finest ice they ever saw."*

All makers of ice and refrigerating machinery admit that a certain amount of power is required to overcome the tension of the springs which hold the inlet valves in position; hence the pressure in the cylinder is less than the evaporating pressure to the extent of the strength of the spring and the friction of the valve. This is by no means theoretical, indicator diagrams taken from a large number of leading machines under all conditions showing the average amount of gas entering their cylinders at each stroke to be little more than three-fourths of what should have been admitted.

On the opposite page is a cut showing the method employed in the "Hercules" to overcome this difficulty—a method so novel and so admirable as to merit a full description.

The piston is seen at the extreme limit of its downward stroke; the cylinder is thus filled with gas, but at much less than its evaporating pressure, as the tension of the spring on the inlet valve prevented the freedom of its flow, as already explained. The incoming gas, entering through the inlet pipe, is admitted to a hollow chamber extending around the cylinder and continuing up its side to the inlet valve. From this chamber, following a line completely around the cylinder, are a large number of openings connecting the chamber with the interior of the cylinder. The piston, just before completing its stroke, passes these openings, whose combined area equals that of the inlet valve, and instantly the entire cylinder is filled by the inflowing gas, which, unchecked by the inlet valve and its spring, has free access to the cylinder at full pressure. As the piston rises it passes the openings, and the gas, now confined in the cylinder, becomes compressed to the required degree. This simple device, found only



## CORSICANA ICE COMPANY,

### CORSICANA, TEXAS.

7½ TONS ICE MAKING. CLOSE OF SECOND SEASON.

*"Not a cent expended for repairs,"*
*"Not a single stoppage from any cause whatever."*
*"You sold us the machine to make seven and one-half tons daily. We get ten tons of solid, pure ice, daily, with the use of only 2,600 lbs. of cheap nut coal."*

*"From large experience with various machines, we unhesitatingly pronounce the 'Hercules' far superior to all others."*

in the "Hercules," and fully covered by letters patent, is beyond question one of the most valuable inventions pertaining to refrigerating machinery.

The work now to be accomplished is to expel all the compressed gas. Should any remain, it again expands, and the power originally required to compress it is lost. Once more the absolutely rigid construction of the compressor comes to our assistance. With positive, unyielding stroke, the piston can be gauged to within a hair's breadth of the upper cylinder head, and, with never varying travel, forces the gas completely from the cylinder.

## THE PUMP VALVES.

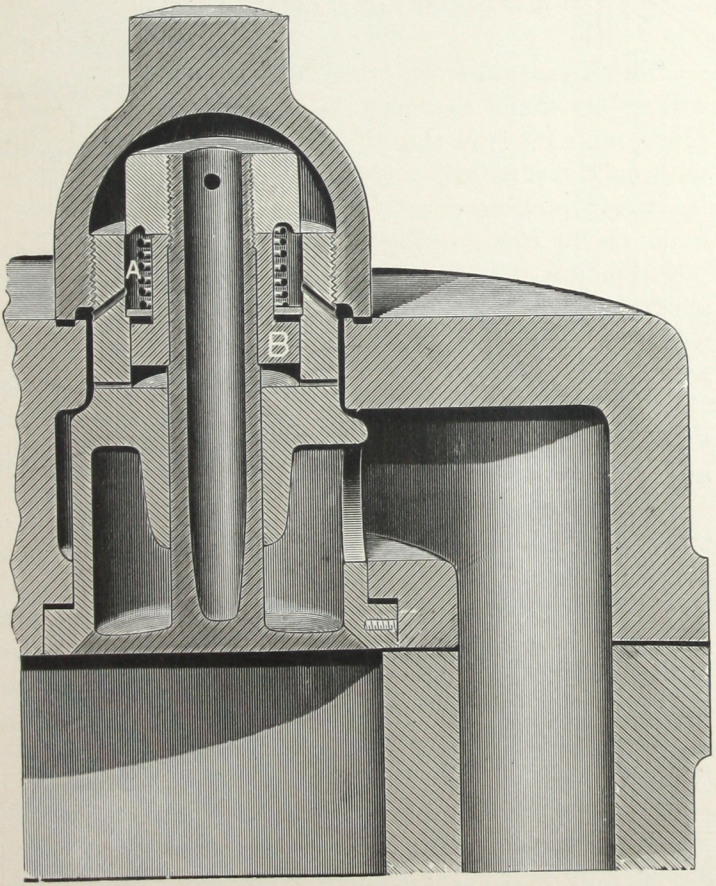
A well-proportioned valve, admitting the gas freely, shutting instantly and without slamming, and remaining tight under constant and long-continued service, is necessary to insure economy and a quiet engine room.

The pump valves used in the "Hercules" possess all these requisites. Areas are limited only by the size of the cylinders, enabling us to make the lift very low to obtain the necessary amount of opening, and, when closing, the distance to be passed over is so slight that the blow of the valve in seating, so commonly heard in other machines, is wholly obviated.

The construction of the valve will be readily understood from an examination of the cut on page 25. The induction, or suction valve is shown closed, the piston being on its upward stroke. Surrounding the upper portion of the valve stem is seen a coiled spring which raises the valve, holding it firmly upon its seat, as shown. As the piston commences

its downward stroke the pressure of the gas from above opens the valve, and the cylinder commences to fill. Below "A" is seen a small passage connecting the gas inlet space on the right with a small chamber on its left, formed by the ring "B" on the valve stem and the bore of the valve cage. This passage opens a little above the bottom of the chamber, and when the valve is fully opened the ring "B" covers the passage, and the gas in the lower portion of the chamber, unable to escape, forms an elastic cushion which prevents any strain on the valve stem, and holds the valve in perfect equilibrium. The downward stroke being completed, the incoming gas no longer presses open the valve, and, by the combined action of the spring and the imprisoned cushioning gas, it is instantly sealed.

The steel of which the valves are made is of an especially fine grade, and is the only metal we have found that would successfully withstand our very rigid tests.


A
B

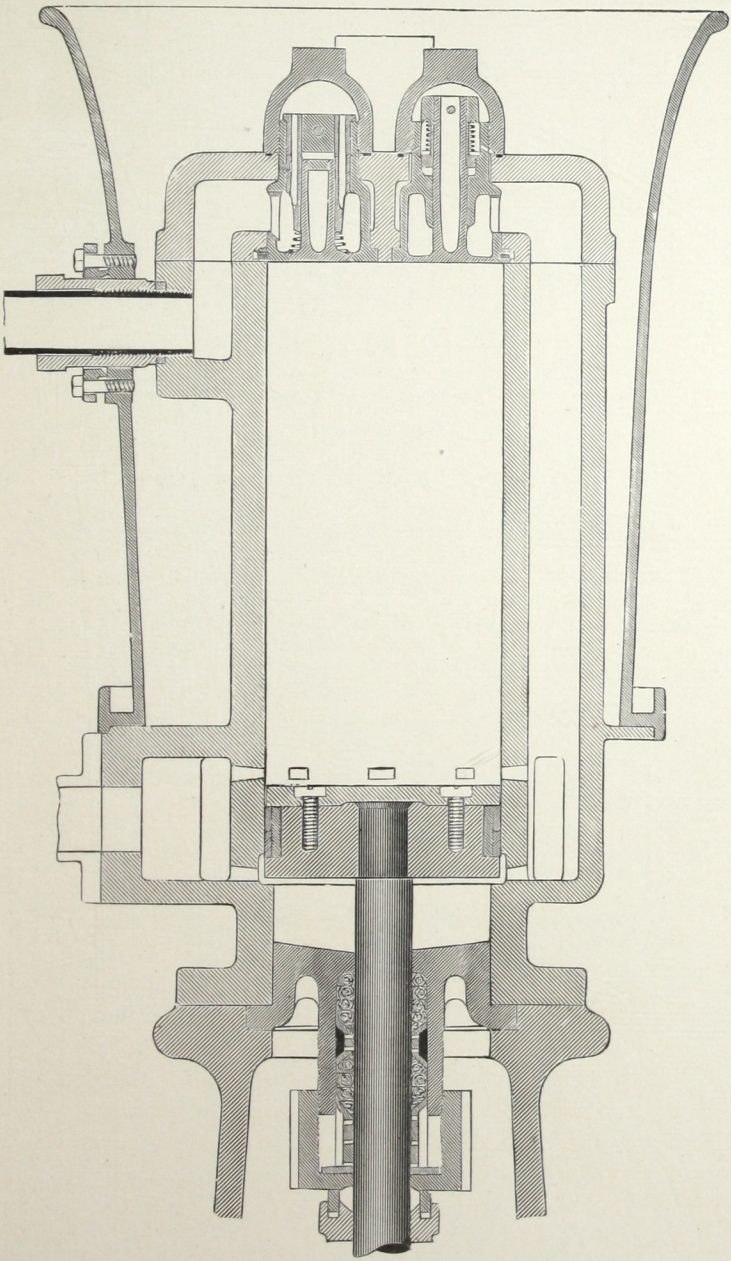
# THE STUFFING BOX.

The leakage of ammonia, even if so slight as to cause but little expense, is always an annoyance. Confined as it is in the pipe system, in endless coils without the possibility of escape, the only portion of the plant needing careful attention to guard against leaks is in the stuffing boxes of the compression pump piston rods. As the cut on the opposite page shows, our stuffing box is of unusual depth, but with whatever care it may be designed, engineers are aware that frequent attention is required in all machines to keep the packing set up enough to prevent leakage, and still not so much as to induce heating and the consequent cutting of the rods.

The "Hercules" stuffing box is under perfect control of the engineer at all times. Its geared gland connects with a short rod extending through the frame, by turning which the engineer is enabled to regulate the pressure upon the packing to any extent while the pump is in motion. Should a trace of ammonia be observed, the leak can be instantly stopped by a slight turn of the handle attached to the end of the rod.

To guard against leakage of ammonia we have, in addition to the very long stuffing box mentioned above, applied the method of continuous lubrication of the piston rod shown in the engraving.

Two oil chambers are provided, and with the packing placed as indicated, the piston rod passes freely and with trifling friction through an absolutely tight stuffing box.



## JACOB DOLD PACKING CO.,

### BUFFALO, N. Y., HOUSE

35 TONS MACHINE.

FIRST SEASON.

*"All right. Doing excellent work."*

*"Would purchase your machine in preference to any other."*

And two years later they did buy two other "Hercules" of 80 tons daily duty, each, for their Wichita, Kansas, house.

---

SECOND SEASON OF ABOVE MACHINE.

*"Fully up to our expectations."*

*"Not stopped an hour for repairs."*

*"Large duty with small consumption of coal"*

*"Scarcely any trace of wear."*

*"In as good condition as when started."*

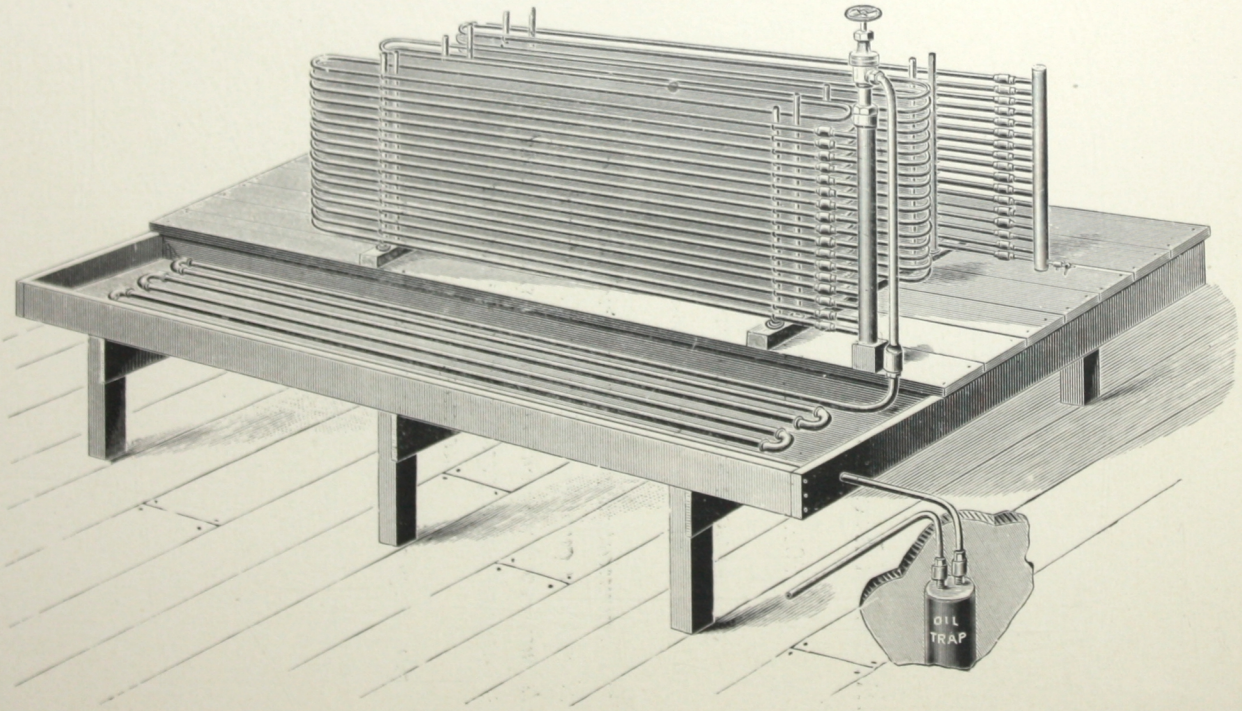
## HERMAN BERGHOFF BREWING CO.

### FORT WAYNE, IND.

40 TONS REFRIGERATING MACHINE.

CLOSE OF SECOND SEASON.

*"Very economical in fuel, water, and ammonia."*
*"Runs very quietly, without jar or strain."*
*"Cools our brewery to our entire satisfaction, and furnishes all the power required to operate our machinery."*
*"In every respect satisfied with our 'Hercules'"*


OIL
TRAP

# THE CONDENSING SYSTEM.

HAVING considered the engine, compression pumps and other machinery forming that portion of the plant which is in motion, we pass to the second division, or the "CONDENSING" side, composed wholly of piping.

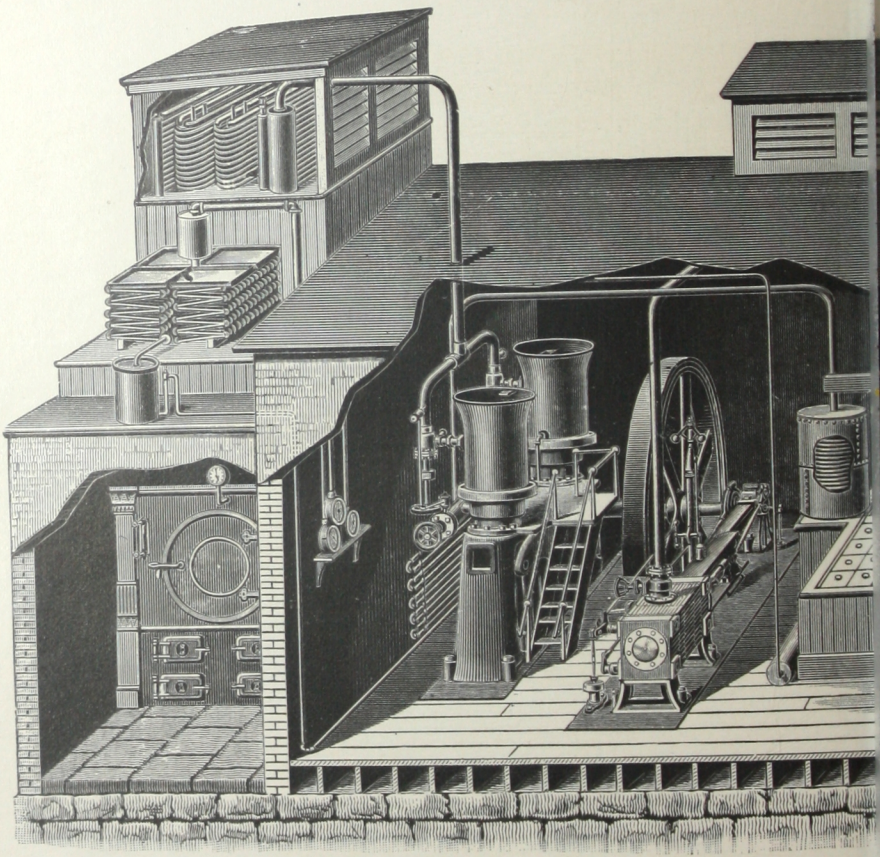
The ammonia—leaving the compression pumps, hot, compressed, but still gaseous—reaches the Condenser, which should be conveniently located on the roof of the building. In the "Hercules" system the Condenser is divided into two parts, namely: the PRELIMINARY CONDENSER and the LIQUIFIER, as shown in the illustration on the opposite page.

The gas when discharged from the compressor passes into a trap, where oil, scale, etc., are deposited; from the trap it passes into the Preliminary Condenser, which is located a little lower than bottom of the Liquifier. After being cooled to a considerable extent in the Preliminary Condenser, it passes out to the Liquifier, where it is cooled to a liquid. The cooling water first passes on to the Liquifier pipes and drops over them, absorbing whatever heat the gas contains. It then flows from the Liquifier into the trough where the Preliminary Condenser is located. After thus performing a double duty in condensing ammonia, the water can be used —in ice machines—for condensing steam.

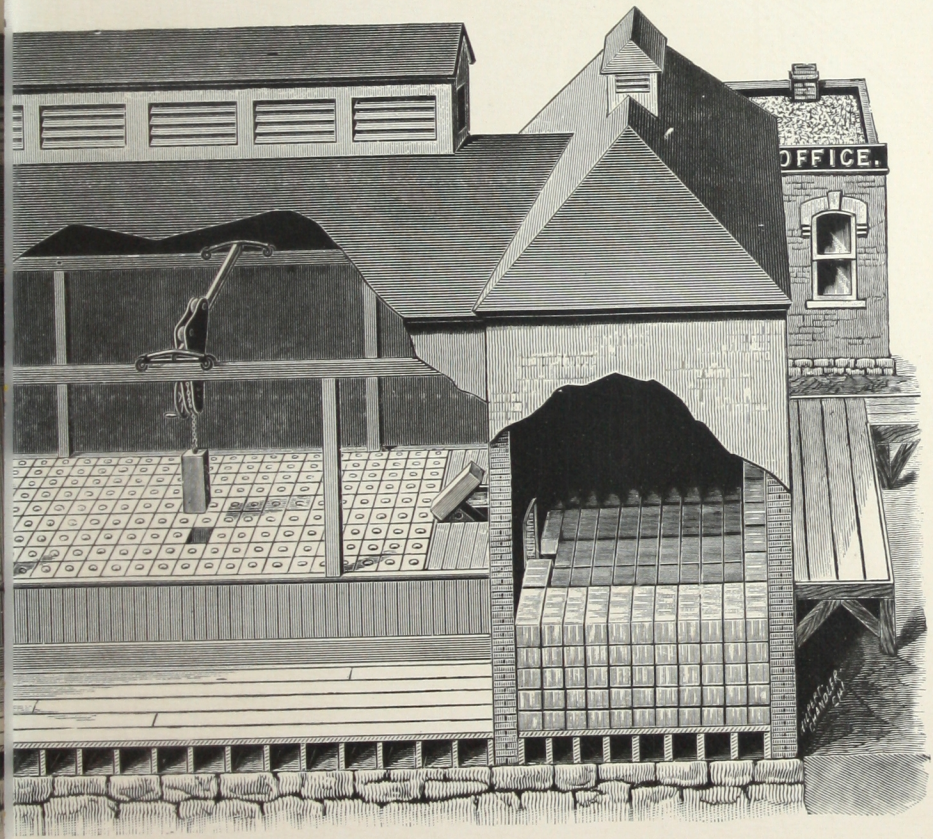
The foregoing is a description of our Open Air Condenser, but we also furnish a Submerged Condenser, composed of an iron tank, with condensing coils within it, wholly submerged. The water passes into the tank at the bottom, and flowing over the Preliminary Condenser performs a double duty, as in the open air condenser. When the ammonia is Liquified it flows into the receiver, where it is ready to perform the work of cooling, either by expanding into coils in tanks, or by expanding into coils in rooms to be cooled.

Our divided form of condenser possesses marked advantages, and is a great improvement over the old method of arrangement still in use by all other manufacturers. The warmest water meets the hottest gas, and, as it has already performed duty on the Liquifier, it is used on the Preliminary Condenser without expense.

The manufacture of the condenser and other pipe systems used by us has received careful attention. We have fitted up a special department for the preparation of our pipe systems, all pipes being carefully welded and bent into endless coils by special machinery. All condenser coils are made from extra heavy special drawn pipe, and the finished coils are tested under many times the pressure they will ever be subjected to in actual use.



A MODE




ICE PLANT.

CLINTON CO-OPERATIVE BREWING CO.,

BUFFALO, N.Y.

35 TONS MACHINE, IN USE ONE YEAR.

*"Fulfilled all the terms of your contract to the letter."*

*"Glad at all times to say a good word for the machine."*

BEAUMONT ICE, LIGHT & REFRIGERATING CO.,

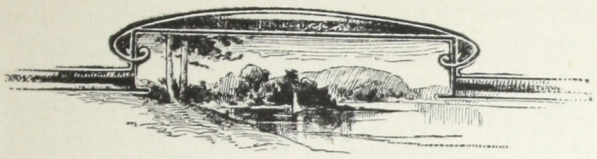
BEAUMONT, TEXAS

TWO MACHINES. 10 TONS ICE MAKING, EACH.

*"Perform more than their guaranteed duty."*

*"Makes the finest ice in the State of Texas."*

*"Satisfactory in every respect."*



# THE EXPANSION SYSTEM.

THE ammonia which left the compression pumps and entered the condenser as a gas through a large pipe, now leaves the condenser in a pipe from one-half to one inch in diameter, and enters the third general division of the system, there again to expand into its original gaseous condition. Whatever heat it has lost in the previous process of condensing, it will regain from whatever surrounds it when allowed to expand.

If we desire the expanding ammonia to extract the heat directly from the rooms in which the articles to be cooled are placed, it is conducted as a liquid into the rooms and there allowed to expand into a system of pipes placed on the ceiling or walls as may be most suitable. This is called the DIRECT EXPANSION system.

In erecting a machine under the Direct Expansion system we use the greatest possible care. Well aware that destruction of property might result from the escape of ammonia, we take every known precaution, and we can assure our patrons of the same safety under the Direct Expansion system as under the brine system. Extra strong pipe, welded into as long lengths as can be handled, and coupled beyond a possibility of a leak, is used in all cases. Heavy wrought iron headers receive and distribute the ammonia to the circulating pipes in each room, and steel valves regulate its flow. The solidity and unusual strength

which characterize the machinery portion of the "Hercules," as already explained, have been carefully followed throughout the entire pipe system.

In a large proportion of the machines for refrigerating purposes, the BRINE SYSTEM is preferred. Where brine is used we furnish steel brine tanks, heavily strapped with steel angle and "T" beams, insulate them in a thorough manner, and, when in an exposed position, lagging them handsomely with wood. Endless coils of pipe are placed in the tanks, the ammonia being admitted to them through steel expansion valves. Standard brass lined, duplex steam pumps draw the brine from the tanks, and circulate it through the piping of the rooms to be cooled, from which it flows back to the tanks by gravity when it has absorbed a sufficient quantity of heat to need recooling.

An important advantage of the BRINE SYSTEM is, that the cold brine filling the storage rooms and tanks can in many cases be circulated by the pump for several hours after the machinery is stopped, and still be sufficiently cool to keep the rooms in proper condition. In that way the necessity of running the machine continuously is avoided.

We are advocates of both the BRINE and the DIRECT EXPANSION systems in their proper places, but prefer in all cases to make a careful inspection of the premises and the work to be accomplished, before advising customers which system to adopt. In the manufacture of ice the BRINE SYSTEM is invariably used, the details of the manner of its application being given in the next chapter.

## HUTCHINSON PACKING COMPANY,

HUTCHINSON, KANSAS

45 TONS REFRIGERATING MACHINE.
CLOSE OF FIRST SEASON.

*"Fully satisfied, and greatly pleased with it in every respect."*

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## SPRINGFIELD ICE & REFRIGERATING CO.

SPRINGFIELD, MO.

TWENTY-FIVE TONS ICE MAKING.
CLOSE OF FIRST SEASON.

*"We are convinced that the 25 tons Hercules ice plant put in for us last summer is all that you claim for it."*

OFFICE OF ANCHOR PACKING CO.

ST. JOSEPH, MO.

*December 6, 1889.*

*The Hercules Iron Works,*

*Chicago, Ill.*

*Gentlemen:—We take pleasure in attesting to your capabilities for turning out work, having built and placed one of your "Hercules" Refrigerating Machines in this Company's plant in complete working order within forty-five days after receiving the order. As far as we have tested the machine it has given excellent satisfaction, and is a model of workmanship.*

*Very truly yours,*

*ANCHOR PACKING COMPANY.*

*WM. H. MORLOCK, Secretary.*

# THE MANUFACTURE OF ICE.

THE manufacture of artificial ice is a test which a good machine should not fear, but which will at once show the weakness of a poor one. There are none of the recommendations of the "Hercules" in which we take more pride than those referring to ice making. Some of our competitors prefer to let ice making alone, confining their trade to refrigerating only. The ease of knowing daily the exact amount of duty the plant is developing is distasteful to the manufacturer who rates his machine far above its capacity, and his exaggerated statements when making the sale are sure to be brought up and an explanation asked when the expected daily number of blocks of ice are not produced.

To make good ice from the various waters offered throughout the country requires not only a good machine, but large experience and technical knowledge as well. We have never failed in any instance to produce pure ice, as solid and clear as crystal, and have in all cases given our customers every pound called for in their contract.

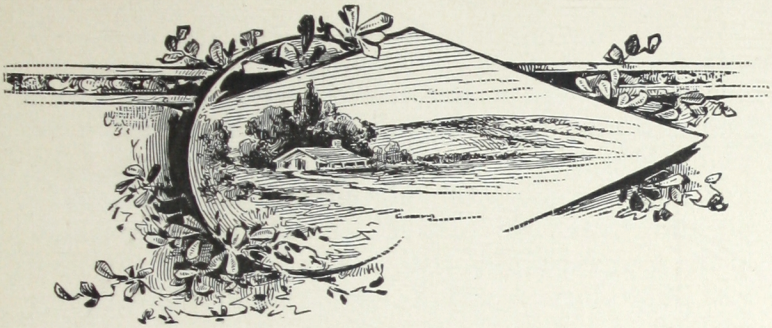
Users of the "Hercules" Ice Making Machine write us that they are producing the "best ice," and those using our ice find its purity all that they could desire.

## CHATTANOOGA ICE & BOTTLING CO.

CHATTANOOGA, TENN.

25 TONS ICE MAKING. CLOSE OF FIRST YEAR.

*"The 25 tons Ice Machine which we purchased from you at the beginning of the season has proven so satisfactory that we have placed with your Company our order for a 45 tons machine, to be erected in February, 1890. This will give us a daily capacity of 70 tons of ice, and be the largest plant in this part of the country."*



# IN CONCLUSION.

IN the foregoing pages we have endeavored in as concise language as possible to present our reasons for claiming the "Hercules" machine to be far in advance of all others. In close proximity to every statement will be found its full corroboration by our customers. Not only have we never failed to make our guarantee upon the formal test at the time of acceptance, but the daily running afterwards in the hands of those who do not profess to be experts, has exceeded the guaranteed duty in every case, and our customers are, without exception, enthusiastic in their praises of the "Hercules."

In conducting our business we act on the principle that what a man does himself is well done. The entire management and control of our business is in the hands of active, practical men, fitted by many years of training for the respective departments they control and who personally supervise all details. We give customers our individual attention, ascertain their wants, and adapt arrangements to meet their various requirements.

We are absolutely free from all combinations or other entangling alliances. We own our own works and patents, attend strictly to our business, and sell

our machines at as low a price as is consistent with honest work. By dealing directly with our customers we avoid employing traveling men under large salaries, and by constructing all parts of our machines in our own works we produce the completed machine at the lowest possible cost. The benefit of this low cost of production and the small cost of making sales we give to our customers, and are placing the "Hercules" on the market at a price as low as that offered by the makers of cheaply constructed rival machines.

We shall be pleased to receive full particulars from parties contemplating the purchase of machines, and will give such inquiries prompt and careful attention, personally inspecting the premises whenever desirable, and making such suggestions as our experience may dictate.

The rapid and satisfactory growth of our business has been wholly due to the excellence of our machine, and to our strict attention to our customers' interests. In the future we shall be governed by the same policy. The "Hercules" will keep pace with the requirements of the day, and will be found at all times to embody all the latest improvements, and our customers need have no fear that their interests when placed in our hands, will receive other than the most careful attention.

HERCULES IRON WORKS.

## OMAHA PACKING COMPANY,

### SOUTH OMAHA, NEBRASKA

THREE REFRIGERATING MACHINES OF 80 TONS DAILY CAPACITY EACH.

ONE IN USE THREE YEARS, AND THE OTHERS TWO YEARS

*"Their excellent record determined us in our choice of a fourth 'Hercules' for the house in Hutchinson, Kansas, in which we are interested. We think the above statement stronger than any formal testimonial."*

OFFICE OF AUG. NUNNING BREWING CO.

ST. JOSEPH, MO.

*November 11, 1889.*

*Hercules Iron Works,*

*Chicago,*

*In answer to favor of the 7th inst., requesting testimonial from me. I take pleasure in testifying to the good working of your 40 tons Refrigerating Machine put in for me last summer, which has, since it started, not only done all you guaranteed, but more too. With two machines of another manufacture, of same capacity, we were never able to get satisfactory results, and feel happy that this difficulty has at last been overcome by your machine.*

*Wishing you all the success you deserve, I am*

*Respectfully yours,*

*AUG. NUNNING.*

THE FOLLOWING IS A LIST OF THE "HERCULES" MACHINES IN OPERATION AND IN COURSE OF CONSTRUCTION TO DATE OF PRESENT ISSUE, JUNE 15, 1891.

THE CAPACITIES ARE STATED IN EQUIVALENTS OF TONS OF ICE MELTED DAILY.

| | | |
|---|---|---|
| | *1885.* | |
| 80 R. | Anglo-American Provision Co., | Chicago Ill. |
| | *1886.* | |
| 80 R. | Jacob Dold Packing Co., | Kansas City, Mo. |
| 40 R. | Jacob Dold Packing Co., 2d Order, | Buffalo N. Y. |
| | *1887.* | |
| 80 R. | Omaha Packing Co., | Omaha, Neb. |
| 80 R. & I.M. | Lone Star Brewing Co., | San Antonio, Tex. |
| 80 R. | Omaha Packing Co., 2d Order, | Omaha, Neb. |
| 80 R. | Omaha Packing Co., 3d Order, | " " |
| | *1888.* | |
| 40 I.M. | Crystal Ice Co., | San Antonio, Tex. |
| 40 I.M. | Crystal Ice Co., 2d Order, | " " " |
| 40 R. | Clinton Co-Operative Brewing Co., | Buffalo, N.Y. |
| 40 R. & I.M. | Herman Berghoff Brewing Co., | Fort Wayne, Ind. |
| 20 I.M. | Anniston Ice Co., | Anniston, Ala. |
| 15 I.M. | Corsicana Ice Co., | Corsicana, Tex. |
| 80 R. | Libby, McNeill & Libby, | Chicago, Ill. |
| | *1889.* | |
| 20 I.M. | Beaumont Ice Co., | Beaumont, Tex. |
| 20 I.M. | Beaumont Ice Co., 2d Order, | " " |
| 80 R. | Jacob Dold Packing Co., 3d Order, | Wichita, Kan. |
| 80 R. | Jacob Dold Packing Co., 4th Order, | " " |
| 50 I.M. | Chattanooga Ice & Bottling Co., | Chattanooga, Tenn. |
| 40 I.M. | Artesian Ice Co., | Fort Worth, Tex. |
| 50 R. | Hutchinson Packing Co., 4th order, | Hutchinson, Kan. |

## *1889.*

| | | |
|---|---|---|
| 40 R. | August Nunning Brewing Co., | St. Joseph, Mo. |
| 50 I.M. | Springfield Ice Co., | Springfield, Mo. |
| 25 R. | St. Joe Stock Yard Co., | St. Joseph, Mo. |
| | J. Dold Packing Co., 15-ton ice plant, 5th order, | Wichita, Kan. |

## *1890.*

| | | |
|---|---|---|
| 80 R. | Libby, McNeill & Libby, 2d Order, | Chicago, Ill. |
| 100 R. | Highland Scot Preserving Co., | Buenos Ayres, S. A. |
| 100 R. | Highland Scot Preserving Co., 2d Order, | " " " |
| 25 R. & I.M. | American Dressed Meat Co., | Portland, Ore. |
| 80 I.M. | Chattanooga Ice & Bottling Co., 2d order, | Chattanooga, Tenn. |
| 40 I.M. | Waco Ice & Refrigerating Co., | Waco, Tex. |
| 50 I.M. | Crystal Springs Ice Co., | Cincinnati, O. |
| 5 R. | M. Christ, Brewer, | Louisville, Ky. |
| 25 I.M. | Schoenfeld & Co., | Jacksonville, Ill. |
| 50 I.M. | Manufactured Ice & Cold Storage Co., | Bloomington, Ill. |
| 100 I.M. | Hercules Ice Co., | Lexington, Ky. |
| 25 R & I.M. | Bristol Ice Co., (Jas. Nelson & Son | Bristol, Eng. |
| 15 I.M. | Lee Wolf, | Mt. Vernon, Ind. |
| 80 R. | Allerton Packing Co., | Chicago, Ill. |
| 5 R. | Luer Bros., | Alton, Ill. |
| 40 R. | Parker, Webb & Co., Packers, | Detroit, Mich. |
| 25 R. | Union Brewing Co,, | Peru, Ill. |
| 100 I.M. | Jacob Dold Packing Co., 6th Order, | Buffalo, N,Y. |
| 25 I.M. | Salsbury Ice Co., | Salsbury, Md. |
| 100 I.M. | Fish Pure Ice Co., | Chicago, Ill. |
| 5 R. | B. Franz & Bro., Packers, | Springfield, Ill. |
| 20 I.M. | Crystal Ice Co., | Denison, Tex. |
| 25 I.M. | Fort Scott Ice Manufacturing Co., | Fort Scott, Kan. |
| 25 R. | Wm. Zoller & Co., Packers, | Alleghany, Pa. |
| | Highland Scot Prvg Co.,25-ton ice plant, 3d order, | Buenos Ayres,S.A |
| | Berghoff Brewing Co., 10-ton ice plant,3d order. | Fort Wayne, Ind. |

## *1891.*

| | | |
|---|---|---|
| 120 I.M. | Consolidated Ice Co., | Philadelphia, Pa. |
| 50 R. | Dallas Packing Co., | Dallas, Tex. |
| 50 R. | Fort Worth Packing Co., | Fort Worth, Tex. |
| 10 R. | S.S. Umbria, Cunard Line, | Liverpool, Eng. |
| 10 R. | S.S. Etruria, " " 2d order, | " " |
| 100 I.M. | Fort Worth Packing Co., 2d order, | Fort Worth Tex. |
| 40 I.M. | Waco Ice & Refrigerating Co., 2d order, | Waco, Tex. |
| 10 R. | S.S. Pennsylvania, Nelson & Sons, 2d order, | Liverpool, Eng. |

*1891.*

| | | | | |
|---|---|---|---|---|
| 10 | R. | S.S. Georgia, Nelson & Sons, | 3d order, | Liverpool, Eng. |
| 10 | R. | S.S. Nevada, " " | 4th " | " " |
| 10 | R. | S.S. Nebraska, " " | 5th " | " " |
| 10 | R. | S.S. Indiana, " " | 6th " | " " |
| 100 | R. | Wells Packing Co., | | Chicago, Ill. |
| 50 | R. | North American Provision Co., | | " " |
| 80 | R. | Allerton Packing Co., 2d order, | | " " |
| 25 | R. | Dostal Brewing Co., | | Denver, Col. |
| 60 | I.M. | Meaders & Osgood, | | Nashvile, Tenn. |
| 40 | I.M. | Hygeia Ice Co., | | Frederick, Md. |
| 15 | R | Theo. Henco, Brewer, | | Spokane Falls, Wash. |
| 6 | I.M. | Smallwood & Son, | | Manhattan, Kan. |
| 50 | I.M. | Dallas Packing Co., 2d order, | | Dallas, Tex. |
| 10 | I.M. | S.S. Sedgmore, Nelson Morris Packing Co., | | Chicago, Ill. |
| 20 | I.M. | Knickerbocker Ice Co., Philadelphia, for | | Cape May, N.J. |
| 50 | R. | Bavarian Brewing Co., | | Chicago, Ill. |
| 6 | R. | Hull & Dillon, Packers, | | Pittsburg, Kan. |
| 40 | R. | Ryan Packing Co., | | Dubuque, Ia. |
| 6 | R. & I.M. | Ills. Southern Hospital for the Insane., | | Anna, Ill. |
| | | J. Dold Packing Co., 30-ton ice plant, 7th order, | | Kansas City, Mo. |

**Equivalent to 3,383 tons of ice melted daily.**

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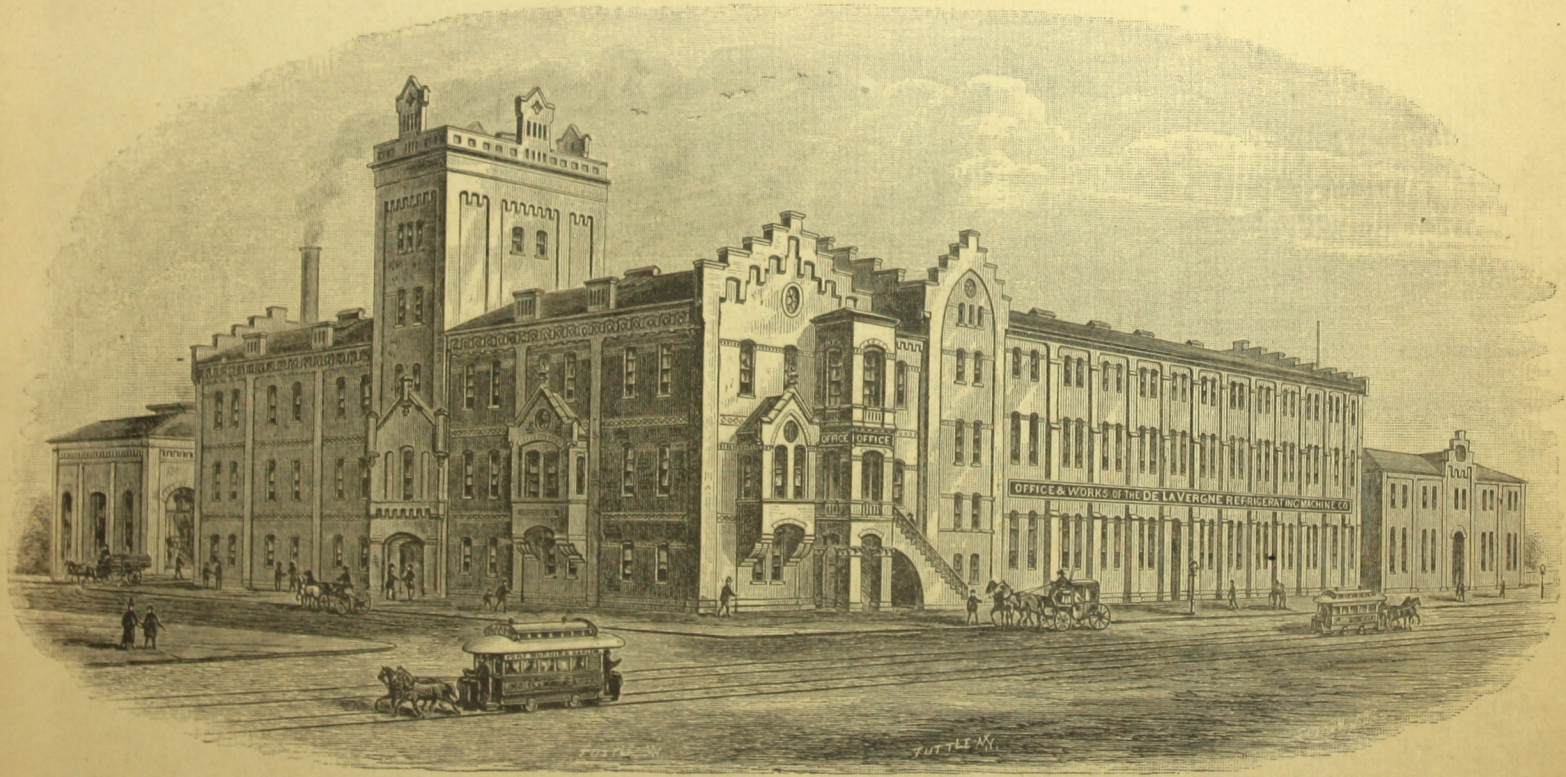
R., *refrigerating.*

R. & I. M., *refrigerating and ice making.*

I. M., *ice making.*




Office and Works of the De La Vergne Refrigerating Machine Co.